

Ionomer-membrane Water Processor System Design and EDU Demonstration, Phase II

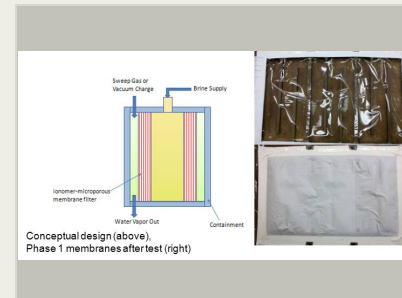
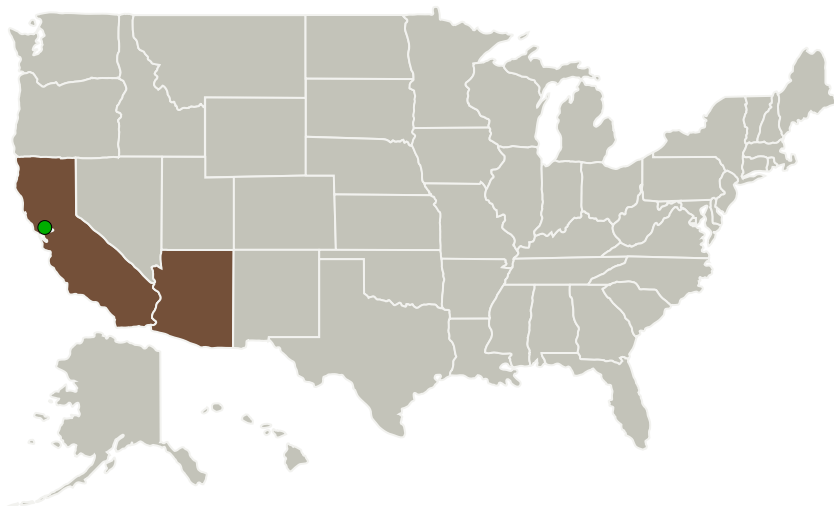
Completed Technology Project (2012 - 2014)



Project Introduction

a. Paragon Space Development Corporation¹ (Paragon) proposes to continue our investigation into the use of microporous-ionomer membrane technology to improve the robustness and effectiveness and simplify water recovery processes for space applications. Improved robustness and effectiveness will be evident through (1) reduced loading on the downstream post processor due to the ionomer's unique property of selective permeability, (2) near complete removal of water from wastewater, and (3) inclusion of a backup barrier between the retentate and permeate. The technology offers simplification over existing technology through (1) a lower dependency on moving parts, and (2) integrated capture of wastewater solutes for disposal. Phase 1 testing showed that 99% of the contaminants in concentrated pretreated urine ersatz were removed by the proposed technology and virtually complete dewatering of the brine was achieved in a configuration that would appear to be insensitive to gravity and orientation. As the technology is fully developed, it can be inserted into existing and/or developing water recovery system architectures to increase water recovery rates beyond that currently available to date. The application of this technology for spacecraft water reclamation will be referenced as IWP (Ionomer-membrane Water Processor).

Primary U.S. Work Locations and Key Partners



Ionomer-membrane Water Processor System Design and EDU Demonstration

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| Organizations Performing Work | Role | Type | Location |
|---------------------------------------|-------------------------|-------------|---------------------------|
| Paragon Space Development Corporation | Lead Organization | Industry | Tucson, Arizona |
| ● Ames Research Center(ARC) | Supporting Organization | NASA Center | Moffett Field, California |

| Primary U.S. Work Locations | |
|-----------------------------|------------|
| Arizona | California |

Project Transitions

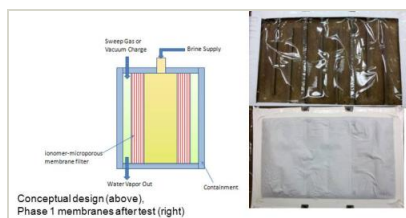
May 2012: Project Start

May 2014: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138238>)

Images



Project Image

Ionomer-membrane Water Processor System Design and EDU Demonstration
(<https://techport.nasa.gov/image/125940>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Paragon Space Development Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

John Straus

Co-Investigator:

John Straus

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Technology Maturity (TRL)

Start: 3
Current: 5
Estimated End: 5



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.2 Water Recovery and Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System